

The Oribatid Mites of *Pseudosasa*—Grass Zone at the Highest Point of the Island of Yaku-shima, South Japan

By

Jun-ichi AOKI*

青木淳一* : 屋久島宮之浦岳山頂ヤクザサ地帯のササラダニ類

In November 1974, the author made a rough investigation on the soil mites of the Island of Yaku-shima and later reported on their vertical distribution (AOKI, 1976). The present paper deals more in detail with the oribatid fauna in the top zone of Mt. Miyanouradake (1935 m above the sea level), the highest mountain in the island, which is interesting from zoogeographical as well as ecological point of view. Vegetation of the zone is quite simple, being occupied by a dense growth of *Pseudosasa owatarii* MAKINO, a dwarf species of about 50 cm in height, and the zone is called in Japanese "Yaku-zasa chitai". Other plant species in the zone belonging to the genera *Calamagrostis*, *Tripetaleia*, etc. appear as a form of "chasmophile", being restricted, in small patches, in excavations or along crevices on huge stones which are situated here and there in the grassland of *Pseudosasa*. Soil samples were taken from these two kinds of plant communities to collect oribatid mites.

1. Species Composition

The oribatid community under the vegetation of *Pseudosasa owatarii* was composed of 19 species and represented by the 3 most dominant species: *Platynothrus peltifer*, *Liochthonius perpusillus* and *Suctobelbella* sp. A (Table 1.). Among them, *P. peltifer* was also found from 10 sampling points down to 900 m above the sea level (AOKI, 1976), though it disappeared from the chasmophile on rock. On the contrary, *L. perpusillus* was also found in the chasmophile, but it was never collected from the points below 1800 m. The oribatid community of the chasmophile was far simple in species composition. Only 9 species were found there, among which *Parachipteria truncata*, *Oribatula sakamorii* and *Prionoribatella impar* were predominant. These 3 species did not become dominant in the remaining 19 points investigated, but appeared in small numbers also in some places higher than 1400 m.

The soils of the two sampling points have only 4 species in common, namely *Lioch-*

* Department of Soil Biology, Institute of Environmental Science and Technology, Yokohama National University, Yokohama

横浜国立大学 環境科学研究センター 土壌環境生物学研究室

Table 1. Species composition of oribatid mites at the two sampling points in *Pseudosasa owatarii*-grassland zone near the top of Mt. Miyanoura-dake.

Litter and soil under <i>Sasa owatarii</i> community (1930 m)		Moss and soil of chasmophile on a rock (1860 m)	
Species	% in number	Species	% in number
<i>Platynothrus peltifer</i> (C.L.KOCH)	31.4	<i>Parachipteria truncata</i> sp. n.	55.6
<i>Liochthonius perpusillus</i> (BERLESE)	21.2	<i>Oribatula sakamorii</i> AOKI	27.8
<i>Suctobelbella</i> sp. A	12.7	<i>Prionoribatella impar</i> sp. n.	11.3
<i>Suctobelbella</i> sp. B	5.9	<i>Eupelops</i> sp. A	2.0
<i>Scheloribates</i> sp. A	5.1	<i>Trimalaconothrus</i> sp.	0.7
<i>Poecilochthonius italicus</i> (BERLESE)	4.2	<i>Liochthonius perpusillus</i> (BERLESE)	0.7
<i>Quadroppia quadricarinata</i> (MICHAEL)	3.4	<i>Hermannia</i> sp. A	0.7
<i>Cultroribula tridentata</i> AOKI	2.5	<i>Ceratoppia quadridentata</i> (HALLER)	0.7
<i>Suctobelbella</i> sp. C	2.5	<i>Scheloribates latipes</i> (C.L.KOCH)	0.7
<i>Synchthonius</i> sp.	1.7		
<i>Tectocephus velatus</i> (MICHAEL)	1.7		
<i>Oppiella nova</i> (OUDEMANS)	1.7		
<i>Eupelops</i> sp. A	0.8		
<i>Ceratoppia quadridentata</i> (HALLER)	0.8		
<i>Procorinetes</i> sp. A	0.8		
<i>Oppia</i> sp. 4	0.8		
<i>Scheloribates latipes</i> (C.L.KOCH)	0.8		
<i>Steganacarus striculus</i> (C.L.KOCH)	0.8		
Damaeidae sp. A	0.8		
Total number	118	Total number	151

thionius perpusillus, *Eupelops* sp. A, *Ceratoppia quadridentata* and *Scheloribates latipes*, and the similarity between their oribatid communities was very low (JACCARD index: 20.0; RENKONEN index: 2.9). As in the case of vegetation, the oribatid community of the chasmophile was quite different from that of *Pseudosasa* grassland and was represented by the oribatid species which seem to be adapted to a more rigorous environment.

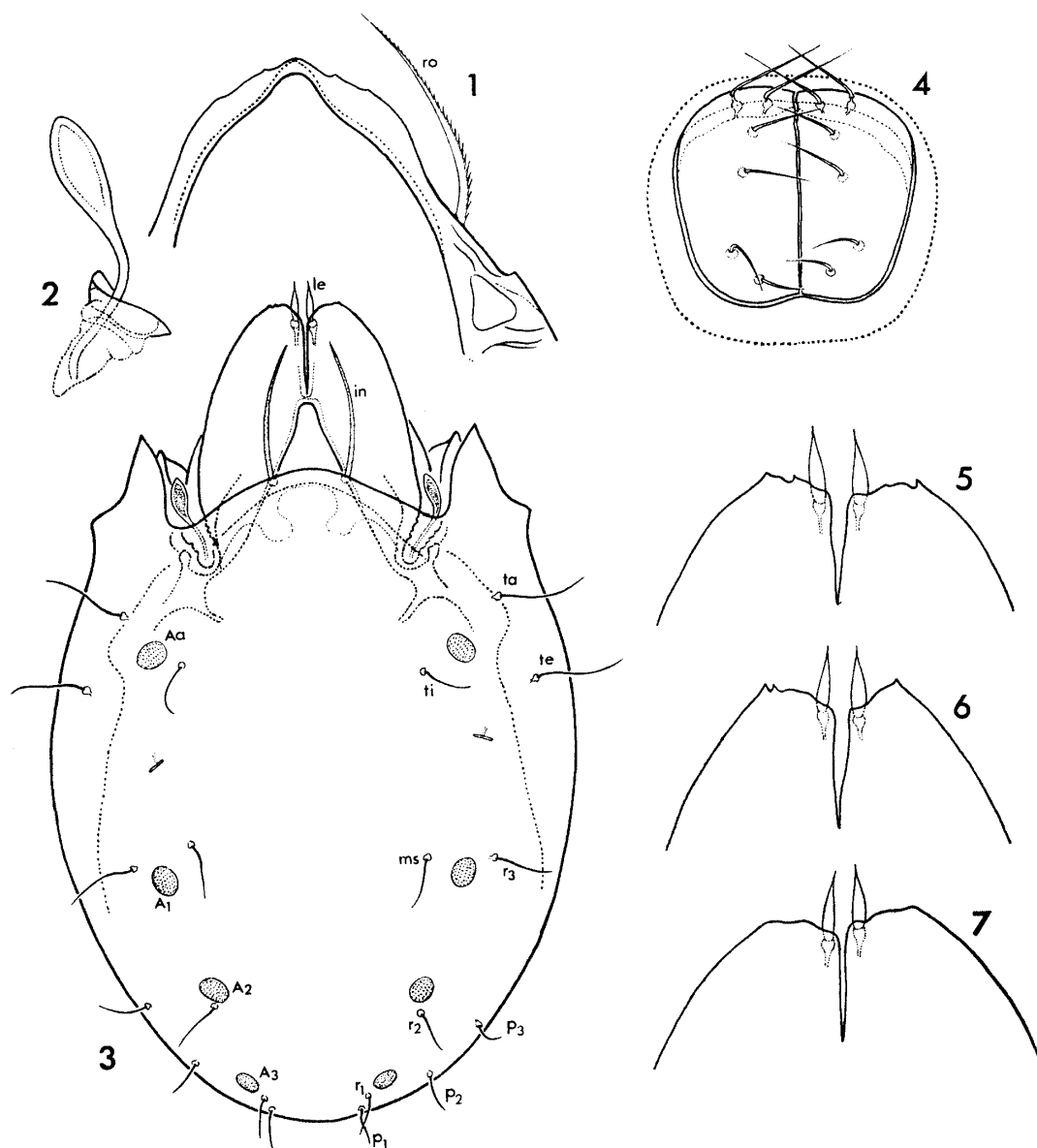
As a whole, the oribatid fauna in the top zone of Mt. Miyanoura-dake is composed of (1) cool-temperate elements such as *Platynothrus peltifer* and *Liochthonius perpusillus*, (2) cosmopolitan or ubiquitous elements such as *Oppiella nova*, *Tectocephus velatus* and *Scheloribates latipes*, and (3) peculiar elements which may possibly be endemic ones. The last-mentioned elements were found among the dominant species under the chasmophile plant community and are described below as new species.

2. Description of New Species

Parachipteria truncata sp. n.

(Figs. 1-7)

Measurement. Body length: 383 (404) 422 μ ; width: 244 (255) 270 μ .



Figs. 1-7. *Parachipteria truncata* sp. n. — 1: Rostral margin in ventral view. — 2: Sensillus. — 3: Dorsal. — 4: Genital aperture. — 5-7: Variation in shape of lamellar cusps.

Prodorsum. Lamella broad, the anterior margin of lamellar cusp rather truncate, without sharp teeth, but only with a few minute teeth varying in shape and size as shown in Figs. 5-7; the teeth become sometimes a little larger (Fig. 6) or almost disappear (Fig. 7). Interspace between lamellar cusps very narrow. Lamellar seta short and thick, pen-like in shape and sharply pointed at tip. Interlamellar seta minutely roughened, the tip not sharply pointed, hardly reaching insertion pore of lamellar seta. Rostral seta, not visible in dorsal aspect, about $3/4$ as long as interlamellar seta, being distinctly barbed unilaterally. Rostral margin in ventral view has a few, very minute teeth (Fig. 1). Sensillus bears a boat-shaped head, nearly clavate-lanceolate, but not pointed at tip (Fig. 2); the organ is short, never reaching the tip of ptermorph projection.

Notogaster. Anterior projection of pteromorpha comparatively broad and short, hardly reaching the level of base of lamellar cusp. Notogastral setae fine and sharply pointed at tip; *ta* and *te* appreciably longer than the remainder. Four pairs of areae porosae large and round, but their outlines are not so distinct; *Aa* located between *ta* and *te*, *A*₁ between *ms* and *r*₃, *A*₂ in front of *r*₂, and *A*₃ anterolateral to *r*₁. Lyrifissure *im* situated between *Aa* and *A*₁.

Ventral side. Genital as well as anal aperture a little wider than long. Genital plates provided with 6 pairs of setae, becoming progressively longer toward anterior direction; relative length of their mutual distances: $g_2-g_2 > g_5-g_5 > g_3-g_3 > g_1-g_1 = g_4-g_4 > g_6-g_6$. Mutual distance of anal setae *an*₁-*an*₁ shorter than *an*₂-*an*₂. Distance of adanal setae *ad*₁-*ad*₂ about half as long as *ad*₂-*ad*₃; *ad*₁-*ad*₁ nearly as long as *ad*₂-*ad*₃. Anal fissure *ian* situated close to and in front of *ad*₃.

Material examined. Holotype (NSMT-Ac 8974 in spirit): Near the top of Mt. Miyanoura-dake, 1860 m, Yaku-shima, 13-XI-1974, J. AOKI, from moss and soil on a rock. — 24 paratopotypes (12 exs. in spirit and 12 exs. on slide): the same data as holotype. Holotype and 8 paratopotypes are deposited in the collection of National Science Museum, Tokyo, and 16 paratopotypes in the collection of Yokohama National University, Yokohama.

Remarks. The present new species is distinguishable from the other members of the genus *Parachipteria* by (1) the truncate lamellar cusps, (2) the short and thick lamellar setae, (3) the broad pteromorphal projections, (4) the short, clavate-lanceolate sensilli, and (5) the large areae porosae.

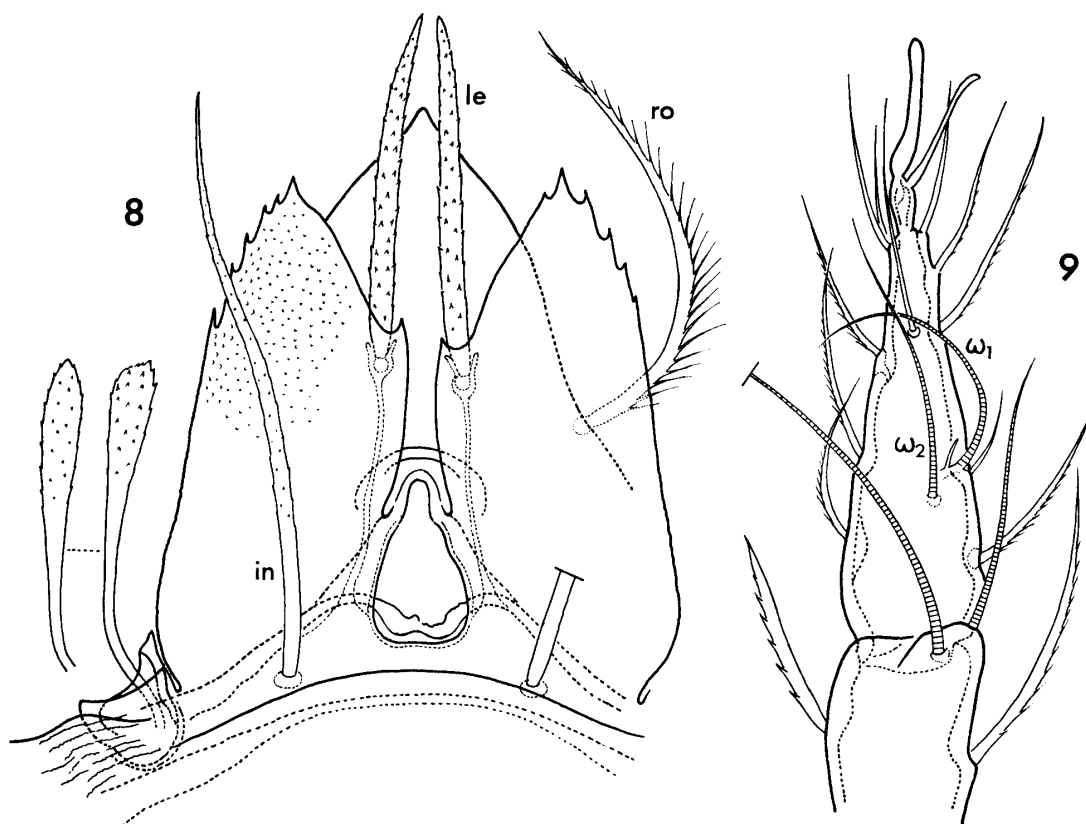
***Prionoribatella impar* sp. n.**

(Figs. 8-9)

Measurement. Body length: 334 (347) 358 μ ; width: 213 (226) 231 μ .

Prodorsum. Lamellae punctured densely and rather irregularly, its outer margin provided with 5-7 teeth. Lamellar seta thick, roughened throughout its length, and rather blunt at tip. Inside the lamellar insertion the lamella has a small tooth. Both the lamellae not close together, but separated from each other by a good interspace, which becomes wider posteriorly to form a peculiar sack-shaped excavation; in Fig. 8 some loop-like structures appear to interrupt the interspace, but in fact the structure take a position lower than the level of lamellae, so that the interspace is completely continuous from between inner teeth of lamellae to the bottom of the posterior excavation. Interlamellar seta twice as long as lamellar seta, more slender and more weakly roughened than the lamellar one. Rostrum pointed at tip, without incisions. Rostral seta bears long barbation unilaterally, its basal part being concealed under lamella. Sensillus club-shaped, being elbowed inward on the basal portion; the tip almost reaching the level of insertion for lamellar seta.

Notogaster. The surface punctured as on lamellae; a striation found in addition on the pteromorphal region. Ten pairs of fine, curved notogastral setae are present. Areae



Figs. 8-9. *Prionoribatella impar* sp. n. — 8: Prodorsum. — 9: Dorsal view of the left tarsus and tibia in part.

porosae Aa about twice as large as the remaining 3 pairs of areae porosae; Aa located anterolateral to ti , A_1 between ms and r_3 , A_2 between r_2 and r_3 , and A_3 anterolateral to r_1 . Lateroabdominal gland opening (gla) situated very close to A_1 .

Ventral side. Genitoanal chaetotaxy: 6123. Anal setae an_1 and an_2 widely separated; only an_1 inserted close to median margin of anal plate. Adanal setae ad_1 and ad_2 situated close together, being separated just for their length; ad_3 located wide apart from them, being situated at the level somewhat posterior to an_2 . Setal formula of epimerata seems to be 2-1-2-2.

Legs. All the legs heterobidactyle (!); the claws of each tarsus composed of a strong outer claw and a weak inner one (Fig. 9); the strong claw directed straight forward along the axis of tarsus like a median claw in the usual case of heterotridactility, while the weak claw is directed inward. Solenidion ω_1 on tarsus I strongly curved, while ω_2 is almost straight. An antiaxial lateral seta each on tarsi I and II as well as on tibiae I and II is stout and with short but strong barbs.

Material examined. Holotype (NSMT-Ac 8972 in spirit): Near the top of Mt. Miya-noura-dake, 1860 m, Yaku-shima, 13-XI-1974, J. AOKI, from moss and soil on a rock. — 15 paratopotypes (8 exs. in spirit and 7 exs. on slide): the same data as holotype. Holotype and 2 paratopotypes are deposited in the collection of National Science Museum, Tokyo, and 13 paratopotypes in the collection of Yokohama National University, Yokohama.

Remarks. The most peculiar features of the present new species are the characteristic structure between lamellae and, especially, heterobidactility. At the observation of the first specimen the author believed that heterodactyle legs had lost their fine outer claws by accident. A careful examination of the remaining 14 specimens, however, revealed that the legs of all the specimens had without exception two claws, strong and weak. Such a heterobidactylity seems to be a very rare case in the order Acaridida. In spite of this peculiarity on the legs, the author considers it appropriate to include the species in the genus *Prionoribatella*, revising the generic characters in part, namely "Legs monodactyle or heterobidactyle" instead of "Legs monodactyle".



Fig. 10. Microarthropods from moss and soil under chamophile near the top of Mt. Miya-noura-dake. — A: *Parachipteria truncata* sp. n. — B: *Prionoribatella impar* sp. n.

要 約

屋久島の山岳のもっとも高い部分（標高 1700～1935 m）は樹木を欠き、一面ヤクシマヤダケ（ヤクシマダケ、ヤクザサ）に覆われ、ヤクザサ地帯と呼ばれている。また、ヤクザサ地帯の所々には巨岩が点在し、その上には岩隙植物群落がへばりつくように生育している。

筆者は1974年11月に屋久島全域の土壌ダニ相（ササラダニ類）の調査を行なったが、今回は上記のもっとも高所にみられる二つの植物群落下のササラダニ相を研究した。その結果、ヤクザサ地帯のササラダニ相は、冷温帯系の種、世界的に広く分布する汎存種、屋久島の高地に特有と思われる種の3种群からなり、屋久島の低地にみられるような暖帯系の種は全く含んでいないことがわかった。岩隙植物群落下の優占種3種のうちの2種は固有種である可能性のあるもので、両種とも新種と認められ、ヤクシマツノバネダニ *Parachipteria truncata* sp. n. およびフタツメノコギリダニ *Prionoribatella impar* sp. n. と命名し記載した。

Reference

- AOKI, J., 1976. Vertical distribution of oribatid mites in Yaku Island, South Japan. *Rev. Ecol. Biol. Sol.* 13: 93-102.